

Appl. No. 10/789093

In the Claims:

Listing of all claims:

1                   1.     (Currently Amended) A method of MIG welding  
2     comprising:  
3                   providing ac power to a weld, wherein the ac power  
4     has a negative portion and a positive portion, and the ac  
5     power further has a frequency;  
6                   wherein the negative portion is greater than the  
7     positive portion;  
8                   wherein the frequency is at least 60 Hz; and  
9                   providing a weld path on at least one workpiece,  
10                  wherein the weld path includes a groove having an angle of  
11                  less than 50 degrees.

1                   2.     (Original)       The method of claim 1, wherein the  
2     frequency is between 90 Hz and 120 Hz.

1                   3.     (Original)       The method of claim 1, further  
2     including providing a consumable, flux-cored, wire to the weld.

1                   4.     (Original)       The method of claim 1, further  
2     including providing a consumable, metal-cored, wire to the weld.

1                   5.     (Original)       The method of Claim 4, wherein  
2     providing the wire includes providing a wire wherein the wire  
3     comprises a sheath encapsulating a core having a core  
4     composition, the core composition comprising a combination of  
5     graphite and one or more compounds of potassium, the combination  
6     of graphite and compounds of potassium in the core composition  
7     not exceeding approximately 5% by weight.

Appl. No. 10/789093

1                   6.    (Original)       The method of Claim 5, wherein  
2   providing the wire includes providing the wire electrode wherein  
3   the one or more compounds of potassium comprise  $K_2MnTiO_4$ .

1                   7.    (Previously Presented)   The method of Claim 6,  
2   wherein providing includes providing the wire wherein the  
3   combination is selected from the range from about 0.3% to about  
4   5.0% by weight.

8.    (Cancelled.)

1                   9.    (Original)       The method of claim 1, further  
2   comprising providing a weld path on at least one workpiece,  
3   wherein the weld path includes a groove having an angle of less  
4   than 30 degrees.

1                   10. (Original)       The method of claim 1, further  
2   comprising providing a weld path on at least one workpiece,  
3   wherein the weld path includes a groove having an angle of  
4   between 20 degrees and 30 degrees.

1                   11. (Original)       The method of claim 1, including  
2   welding at a rate of at least 35 pounds per hour using a single  
3   arc.

1                   12. (Original)       The method of claim 11 including  
2   welding at a rate of at least 40 pounds per hour.

1                   13. (Original)       The method of claim 11 wherein the  
2   negative portion is at least twice the positive portion.

1                   14. (Original)       The method of claim 10 wherein the  
2   negative portion is at least 1.5 times the positive portion.

Appl. No. 10/789093

1           15. (Original)       The method of claim 1 wherein the  
2 weld process begins with a first negative portion having a  
3 duration of at least 0.5 seconds.

1           16. (Original)       The method of claim 14 wherein the  
2 weld process begins with a first negative portion having a  
3 duration of at least 0.75 seconds.

1           17. (Original)       The method of claim 1 further  
2 including providing a stick-out of about 2 inches.

1           18. (Original)       The method of claim 17 further  
2 comprising providing a shielding gas at a rate of at least 80  
3 cubic feet per hour.

1           19. (Previously Presented)   A method of MIG  
2 welding comprising:  
3           providing ac power to a weld, wherein the ac power  
4 has a negative portion and a positive portion, and the ac  
5 power further has a frequency of between 30 Hz and 120 Hz;  
6 and  
7           providing at least one workpiece with a weld path  
8 thereon, wherein the weld path includes a groove having an  
9 angle of less than 50 degrees.

1           20. (Original)       The method of claim 19, wherein  
2 providing at least one workpiece includes providing the weld path  
3 with the groove having the angle between 20 degrees and 30  
4 degrees.

Appl. No. 10/789093

1                   21. (Original)       The method of claim 19, wherein  
2 providing at least one workpiece includes providing the weld path  
3 with the groove having the angle less than 30 degrees.

1                   22. (Original)       The method of Claim 21, further  
2 comprising providing a wire comprising a sheath encapsulating a  
3 core having a core composition, the core composition comprising a  
4 combination of graphite and one or more compounds of potassium,  
5 the combination of graphite and compounds of potassium in the  
6 core composition not exceeding approximately 5% by weight.

1                   23. (Original)       The method of Claim 22, wherein  
2 providing the wire includes providing the wire electrode wherein  
3 the one or more compounds of potassium comprise  $K_2MnTiO_4$ , and the  
4 combination is selected from the range from about 0.3% to about  
5 5.0% by weight.

24-42.       (Cancelled.)

1                   43. (Previously Presented)   A method of MIG  
2 welding comprising:  
3                   providing ac power to a weld, wherein the ac power  
4 has a negative portion and a positive portion, and the ac  
5 power further has a frequency between 30 Hz and 120Hz;  
6                   wherein the negative portion is greater than the  
7 positive portion; and  
8                   wherein the weld process begins with the negative  
9 portion of at least 0.5 seconds duration.

1                   44. (Original)       The method of claim 43 wherein the  
2 weld process begins with a first negative portion having a  
3 duration of at least 0.75 seconds.

Appl. No. 10/789093

45-48. (Cancelled.)

1                   49. (Currently Amended) A MIG welding system  
2           comprising:  
3                   power means for providing ac power to a weld,  
4           wherein the ac power has a negative portion and a positive  
5           portion, and the ac power further has a frequency; and  
6                   control means for controlling the power means,  
7           wherein the negative portion has a negative amp-seconds and  
8           the positive portion has a positive amp-seconds, wherein the  
9           control means causes the negative amp-seconds to be greater  
10          than the positive amp-seconds, and wherein the frequency is  
11          at least 60 Hz, and wherein the weld process begins with the  
12          negative portion of at least 0.5 seconds duration.

1                   50. (Original)       The system of claim 49, wherein the  
2           control means includes means for providing the frequency to be  
3           between 90 Hz and 120 Hz.

1                   51. (Original)       The system of claim 49, further  
2           including a consumable, flux-cored, wire, disposed to be provided  
3           to the weld.

1                   52. (Original)       The system of claim 51, wherein the  
2           wire is metal-cored.

1                   53. (Original)       The system of claim 52, further  
2           comprising a weld path on at least one work piece, wherein the  
3           weld path includes a groove having an angle of less than 50  
4           degrees.

1                   54. (Original)       The system of claim 49, further  
2           comprising a weld path on at least one workpiece, wherein the

Appl. No. 10/789093

3 weld path includes a groove having an angle of less than 30  
4 degrees.

1 55. (Original) The system of claim 54 wherein the  
2 control means for includes means for causing the negative amp-  
3 seconds to be at least twice the positive amp-seconds.

1 56. (Original) The system of claim 49 wherein the  
2 control means includes means for causing the negative amp-seconds  
3 to be at least 1.5 times the positive amp-seconds.

57. (Cancelled.)

1 58. (Original) The system of claim 49 wherein the  
2 control means includes means for causing the weld process to  
3 begin with a first cycle portion having a duration of at least  
4 0.75 seconds.

59-79. (Cancelled.)

1 80. (Original) A method of controlling  
2 dilution in MIG welding comprising:  
3 providing ac power to a weld, wherein the ac power  
4 has a negative portion and a positive portion, and the ac  
5 power further has a frequency;  
6 controlling the balance of the negative portion  
7 and the positive portion to obtain a desired dilution.

1 81. (Original) The method of claim 80 wherein the  
2 negative portion is greater than the positive portion.

1 82. (Original) The method of claim 80 wherein the  
2 negative portion is less than the positive portion.